

THE FAMILY TURRIDAE IN THE INDO-PACIFIC

Part 1a. The subfamily Turrinae concluded

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In this section, the Turrinae of the Indo-Pacific is concluded by the inclusion of five genera of rather uncertain relationships which, upon the available evidence, seem to have more in common with the Turrinae than with any of the other subfamilies. New Hawaiian *Gemmula* and *Xenuroturrus* are also included.

Below are listed the recognized taxa for the remainder of the Turrinae. The earlier list appeared in volume 1, no. 5, on pages 235-237 [pp. 22-669 to 22-671]. As before, taxa not represented in the Indo-Pacific are in square brackets, and with these only the type species is cited. Fossils are prefixed by a dagger (†). When a species occurs both Recent and fossil, the dagger occurs after the name.

Included in the list are southern Australian and New Zealand Recent and Tertiary Turrinae. Such species are not excluded, since they have had an Indo-Pacific origin during past periods of the Tertiary when warm waters extended farther south than they do at present.

List of Recognized Taxa in the Turrinae
(concluded)

Subfamily TURRINAE

Heteroturrus Powell, new genus
sola Powell, new species. Type

Turridrupa Hedley, 1922

acutigenmata (E. A. Smith, 1877). Type

albofasciata (E. A. Smith, 1877)

armillata (Reeve, 1845)

astrica (Reeve, 1843)

subsp. *consobrina* Powell, new subspecies

bijubata (Reeve, 1843)

cerithina (Anton, 1839)

cincta (Lamarck, 1822)

deceptrix Hedley, 1922

diffusa Powell, new species

jubata (Hinds, 1843)

†*maoria* Powell, 1942

prestoni Powell, new name

weaveri Powell, new species

Austroturrus Laseron, 1954

steira (Hedley, 1922). Type

Taranis Jeffreys, 1870

[*mörchi* Malm, 1863]. Type

allo (Jousseaume) Lamy, 1934

benthicola (Dell, 1956)

bicarinata (Suter, 1915)†

gratiosa (Suter, 1908)

imporcata (Dell, 1962)

maji (Verco, 1909)

†*nexilis* (Hutton, 1885)

subsp. *recens* (Fleming, 1948)

percarinata Powell, new species

spirulata (Dell, 1962)

ticaonica Powell, new species

turritispira (E. A. Smith, 1882)

vestalis (Hedley, 1903)

Micropleurotoma Thiele, 1929

?†*ashiyacensis* Shuto & Ueda, 1963

spirotropoides (Thiele, 1925). Type

Additional Species

Gemmula Weinkauff, 1875 [p. 22-703]

pseudomonilifera Powell, new species

interpolata Powell, new species

congener new subsp. *unilineata* Powell

tessellata Powell, new species [p. 22-734a]

microscelida (Dall, 1895)

Xenuroturrus Iredale, 1929 [p. 22-967]

gemmuloides Powell, new species

[These occasional blank areas occur between genera and subgenera to permit the insertion of new material and future sections in their proper systematic sequence.]

Genus *Heteroturris* Powell, new genus

Type: *H. sola* Powell, 1967

A new genus is required for a species represented by only one specimen, which was dredged in 162 fathoms off the Philippines by the *Albatross* Expedition. This shell is problematic in its relationships but appears to be most nearly allied to *Lophiotoma*.

The general appearance of an elongate-fusiform shell with a tall spire, narrow body-whorl tapered to a long straight anterior canal, and with sculpture of a few strong smooth keels, suggests *Polystira*, but both the protoconch and the sinus negate inclusion in that genus. The single thread bisecting the sinus area of the shoulder slope and the polygyrate, axially-costate protoconch recall *Turridrupa*, but again both the sinus and the long, tapered anterior end do not match that genus. The regular, crisp axial threads which cross the sinus area resemble those of *Microdrillia* but otherwise there is no similarity to that genus. The deep parallel-sided posterior sinus is not like that in the subfamily Turriculinae. However, it does appear to be a member of the Turrinae with a modified *Lophiotoma*-type sinus which, instead of being narrow and peripheral, occupies the greater part of the shoulder slope between a heavy subsutural margining cord and the peripheral carina. The polygyrate, tall, conical, axially-costate protoconch and the elongate-fusiform shell show close affinities to *Lophiotoma*.

Heteroturris sola Powell, new species

(Pl. 298)

Range — Philippines, south east of Talicayo, Cebu, in 162 fathoms.

Description — Shell rather small, 18 mm. (¾ inch) in height, narrowly fusiform with tall spire and long straight unnotched anterior canal. Whorls 8, plus a tall, narrowly conic protoconch of approximately 4-4½ whorls, strongly sculptured with closely spaced, somewhat flexed, axial ribs; initial whorls, estimated at 1½, missing. The protoconch passes abruptly into the post-nuclear sculpture, which is strongly bicarinate. The lower or peripheral carina is undulatingly nodulose for the first 2-2½ post-nuclear whorls, after which the carinae are smooth and rounded. The uppermost of the two initial carinae resolves into a strong but narrowly crested subsutural margining cord, the lower one into the

heavier smooth medial peripheral carina. There is a third smooth cord on the later whorls, between the peripheral carina and the lower suture. On the last two whorls a fourth cord is half-emergent at the lower suture. About 13 smooth cords are on the base and neck from below the peripheral carina, and there is an occasional weak intermediate thread. Between the spirals there is a dense surface sculpture of distinct, crisp, axial threads, strongest on the shoulder slope where they mark the successive positions of the apex of the sinus. These are crossed medially by a single smooth thread. Spire and aperture plus canal of about equal height. Aperture long and narrow, slowly tapered below. Posterior sinus broad and deep, with parallel sides, its apex square-cut, the whole occupying the entire shoulder slope from between the subsutural margining cord to the peripheral carina. Colour uniformly ivory-white.

Measurements (mm.) —

height	width	
18.0	5.5	holotype

Types — The unique holotype is in the United States National Museum, Washington (*Albatross* Sta. 5412, USNM 232702).



Plate 298. *Heteroturris sola* Powell, new genus and new species. 162 fms., off Cebu Id., Philippines. 18 mm. Holotype, USNM no. 232702.

***Austroturris steira* (Hedley, 1922)**

(Pl. 299)

Range — New South Wales, 30-50 fathoms.*Measurements* (mm.) —

height	width
5.8	2.6

Synonymy —1922 *Filodrillia steira* Hedley, Rec. Aust. Mus., 13(6), p. 224, pl. 42, fig. 11.1954 *Austroturris steira* (Hedley), Laceron, The N.S.W. Turridae, Handbook Roy. Zool. Soc. N.S.W., p. 6, pl. 1, figs. 3, 4.*Records* — NEW SOUTH WALES: off Cape Three Points, 50 fathoms (type locality); off Sydney, 30-50 fathoms (Laceron).*Types* — The holotype is in the Australian Museum, Sydney.**Genus *Austroturris* Laceron, 1954***Type: Filodrillia steira* Hedley, 1922

"A genus much more closely related to *Turridrupa* than to *Filodrillia*, from which the sinus alone distinctly separates it. In *Filodrillia* the sinus is subtubular like that of *Etrema*, in *Austroturris* it is wide and open immediately above the peripheral keel and with a thin inner margin. This sinus is similar to that of *Turridrupa*, as is the sculpture consisting primarily of a strong peripheral keel, with lesser spiral keels below and fine axial threads between the keels. The protoconch, however, is different, of only two smooth whorls, and without a third whorl with axial riblets. It is also distinguished from *Turridrupa* by a well marked fasciole area crossed by fine curved axial threads." (Laceron)

Synonymy —

1954 *Austroturris* Laceron, The New South Wales Turridae. Zool. Handb. Royal Zoological Society of N.S.W., p. 6: Type by original designation: *Filodrillia steira* Hedley, 1922.



Plate 299. *Austroturris steira* (Hedley). 5.8 mm. 30-50 fms., New South Wales, Australia (from Hedley, 1922, pl. 42, fig. 11).

Genus *Turridrupa* Hedley, 1922

Type: *Pleurotoma acutigenmata* E. A. Smith, 1877

This is a problematic genus since several subfamily alternatives suggest themselves. In general appearance, these shells resemble small stout clavinids, and in accord with that subfamily, the sinus is situated, typically, at about the middle of the shoulder slope. Here, however, comparison ends, for the clavinid sinus is spout-like, constricted above, either by a heavy subsutural fold, a strong parietal tubercle, or both. In *Turridrupa* the sinus is simple U-shaped, not restricted above by either a subsutural fold or by a parietal tubercle, but has its apex, normally, at the termination of one or two spiral cords or threads that bisect the shoulder area. The sinus is, therefore, comparable with that of *Turris*, which has its apex situated on a rib above the peripheral carina.

It is of interest to note that Thiele (1929) placed *Turridrupa* as a section of *Gemmula*, an undoubted member of the *Turrinae*.

The radula, however, presents another problem, for it has a formula of $1+0+1+0+1$ (*jubata*); the marginal is massive and neither "wishbone-shaped" nor bifid; the lateral is absent; and the central large and broad-based.

This enlargement of the central tooth to compensate for the missing lateral is a common feature of the *Cochlespirinae*, i.e., *Aforia*, and in some species ascribed to *Leucosyrinx* (not the type species), but in all these, the marginals are bifid-based, wishbone-shaped, or separated into two components. All other characters exclude *Turridrupa* from the *Cochlespirinae*.

The protoconch, typically, has about three whorls, the first two being smooth, the last one distinctly axially costate. The operculum is leaf-shaped, with a terminal nucleus.

The Recent geographical range of *Turridrupa* covers most of the Indo-Pacific. A New Zealand fossil species, *maoria* Powell, 1942, takes the genus back to the upper Miocene.

Of the Recent species listed by Hedley (1922) as belonging to *Turridrupa*, five belong elsewhere. To the clavinid genus *Microdrillia*, I add *commentica* (Hedley, 1915), *fastoda* (Hedley, 1907) and *pertinax* (Hedley, 1922). To the turriculinid genus *Vexitomina* I add *rougeygroni* Souverbie, which is a synonym of *regia* (Reeve, 1842). The species *sibogae* (Schepman, 1913) is probably a clavinid. It superficially resembles *Turridrupa cerithina* (Anton, 1839), but has two smooth whorls in the protoconch. Several Japanese species referred to *Turridrupa* in Kuroda and Habe (1952, Check List and Bibliography of the Recent Marine Mollusca of Japan) would also be better accommodated in the subfamily Clavininae.

Synonymy —

1922 *Turridrupa* Hedley, A revision of the Australian Turridae, Records of the Australian Museum, vol. 13, no. 6, p. 226. Type: by original designation: *Pleurotoma acutigenmata* E. A. Smith, 1877.

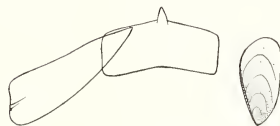


Plate 300. *Turridrupa jubata* (Hinds). Radula and operculum from specimen from Bohol Ids., Philippines.

Key to species and subspecies of *Turridrupa*

- A. Sinus apex at end of mid-shoulder cord
 Sinus cord finely gemmate
 Colour whitish with subsutural brown band
armillata (Reeve)
 Colour yellowish brown; anterior end, white
jubata (Hinds)
 Sinus cords of elongated knots
 Small narrow shell (17-21 mm.)
 Knots large; few, 13-14 per whorl
acutigemmata (E. A. Smith)
 Large broad shell (25-33 mm.)
 Knots weak, 17 per whorl *prestoni* Powell
 All cords smooth
 Shell broad; unicoloured yellowish brown
cincta (Lamarck)
 Shell tall, narrow; unicoloured buff .. *deceptrix* (Hedley)
 All cords smooth to waved
 Cords buff on dark brown ground *bijubata* (Reeve)
 Peripheral cord tuberculate
 Reddish brown; pale subperipheral zone
albofasciata (E. A. Smith)
 B. Sinus apex at end of several mid-shoulder threads
 All spirals gemmate
 Colour pattern checquered *cerithina* (Anton)
 C. Sinus apex at end of peripheral cord
 Peripheral cord only maculated
 Alternate white and brown dashes *stricta* (Reeve)
 Unicoloured dashes, defined by blotches .. *diffusa* Powell
 All spire cords maculated
 Alternate light and dark dots .. *stricta consobrina* Powell
 Spire brown-streaked; base pale *weaveri* Powell



Plate 301. Fig. 1, *Turridrupa acutigemmata* (E. A. Smith). Holotype, 21 mm., no locality. Fig. 2, *T. deceptrix* Hedley, 14 mm. Darnley Id., Queensland, Australia. Fig. 3, *T. jubata* (Hinds), 22.5 mm. Off Arakabesan Id., Palau Islands.

Fig. 4, *T. prestoni* Powell, new name, 33 mm. Port Blair, Andaman Islands. Fig. 5, *T. cincta* (Lamarck), 16.5 mm. Mauritius.

Turridrupa acutigemmata (E. A. Smith, 1877)

(Pl. 301, fig. 1)

Range—Persian Gulf to East Indies, Japan and north Queensland.

Remarks—This species is easily recognized by its slender shape, tall spire and comparatively few, strong, laterally elliptical gemmules on the sinus rib; each gemmule is buttressed top and bottom by a swelling. In *jubata*, the nearest related species, the gemmules are more numerous, less conspicuous, and somewhat oblique, which imparts the appearance of a strand of unravelled rope.

Description—Shell small, 17-21 mm. (about $\frac{3}{4}$ inch) in height, narrowly fusiform, with a tall spire, almost twice the height of the aperture and canal. Spire whorls sculptured with three strong keels and a fourth emergent, or half emergent, over the last two or three whorls. Base with an additional seven keels, from below the lower sutural one to the anterior fasciole, which bears several indistinct spirals. Subsutural keel smooth, moderately strong, sinus keel strong, with laterally elliptical gemmules, about 13 or 14 per whorl, which are buttressed top and bottom by swellings, followed by a massive smooth peripheral keel; all keels other than the sinus one are smooth. Interstices of keels with two or three fine spiral threads. Sinus deep, U-shaped, its apex at the termination of the gemmate keel. Colour uniformly yellowish brown to reddish brown.

Measurements (mm.)—

height	width	holotype
21.0	7.5	New Britain
17.0	6.0	

Synonymy—

- 1877 *Pleurotoma acutigemmata* E. A. Smith, Ann. Mag. Nat. Hist., Ser. 4, 19, p. 489.
 1884 *Pleurotoma jubata* (non Hinds) (pars), Tryon, Man. of Conch., 6, p. 171.
 1896 *Pleurotoma acutigemmata* Smith, Melvill and Sykes, Proc. Malac. Soc. 2, p. 165.
 1904 *Pleurotoma acutigemmata* var. *minor* E. A. Smith, Ann. Mag. Nat. Hist., Ser. 7, 13, p. 457 (non *Pl. minor* C. B. Adams, 1845; Evans and Schumard, 1857, nor Jeffreys, 1867).
 1913 *Pleurotoma (Hemipleurotoma) acutigemmata* Smith, Schepman, Siboga Exped., Pt. 5, 49e, p. 400.
 1917 *Turris (Tomopleura) acutigemmata* (Smith), McVill, Proc. Malac. Soc., 12, p. 146, pl. 8, fig. 1.
 1922 *Turridrupa acutigemmata* (Smith), Hedley, Rec. Aust. Mus., 13(6), p. 226, pl. 42, figs. 12, 13.
 1940 *Turris (Turridrupa) acutigemmata* var. *minor* (Smith), Winckworth, Proc. Malac. Soc., 24(1), p. 24.
 1960 *Turridrupa jubata* (non Hinds) (pars), Oyama and Takemura, The Molluscan Shells, 4, fig. 9 (= *acutigemmata*, non fig. 10, which is *jubata*).

Records—Locality unknown (type); PERSIAN GULF: Gulf of Oman, Muscat, 20-40 fathoms (Melvill, 1917). CEYLON: off south coast (type of var. *minor*). INDONESIA: Bay of Bima, 55 metres; near south coast of Timor, 34 metres (Schepman, 1913). WEST NEW GUINEA: straits north of Misool Id. (Schepman, 1913). NEW BRITAIN (AWBP coll.). JAPAN: Izu Peninsula (Oyama and Takemura, 1960). QUEENSLAND: Darnley Island, 20 fathoms; Hope Island, 5-10 fathoms (Aust. Mus.); Low Isles, near Port Douglas; Lindeman Island (AWBP coll.). FIJI: main reef, Navua Passage, 2 feet (W. Jennings, Aug., 1963).

Types—The holotype of *acutigemmata* is in the British Museum (Natural History).

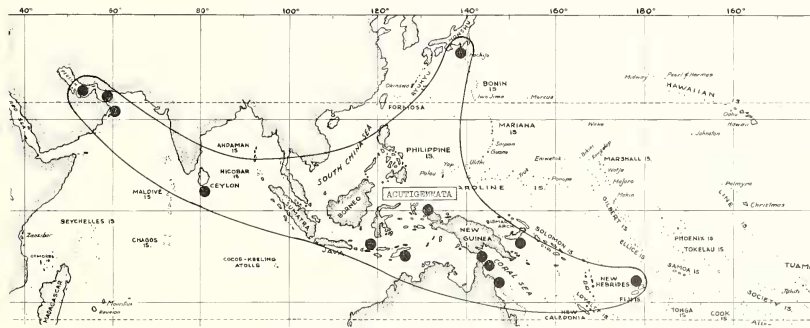


Plate 302. Geographical distribution of *Turridrupa acutigemmata* (E. A. Smith).

***Turridrupa albofasciata* (E. A. Smith, 1877)**

(Pl. 303, figs. 3, 4)

Range — Hawaiian Islands, Japan and New Caledonia.

Remarks — This common Hawaiian turrid occurs in many collections under a manuscript name of Dall's, which I do not quote, since to the best of my knowledge the name has not as yet appeared in print. Elsewhere in his manuscript Dall referred to *albofasciata* Smith as an indeterminate species, since it had never been figured. However, the well-preserved holotype, in the British Museum, leaves no doubt that *albofasciata* is the name to be used for this Hawaiian shell.

The species stands close to *bijubata*, from which it differs in the very strong undulations of the peripheral keel, a different form of subsutural margin, fewer and stronger interstitial spiral threads, and the presence of a pale band between the peripheral and lower keels.

The species *bijubata* occurs in the Hawaiian group also but not commonly. Also, although some forms of *bijubata*, notably those from both Mauritius and New Caledonia, develop strong undulations, the form of the subsutural margin and the coarser, decussated interstitial sculpture remain constantly exclusive to *albofasciata*, as also does, apparently, the pale submedian band.

It is likely that Hervier's *gatchensis* from the Loyalty Islands is a synonym of *albofasciata* rather than a nodulose form of *bijubata*. Hervier's figure, which is small and indistinct, shows a deep violet-grey shell with a subperipheral reddish brown spiral band, and both the peripheral and subperipheral spirals appear to be undulating and subnodose. Also the Japanese shells ascribed to *gatchensis* by Oyama and Takemura (1960, pt. 4, figs. 6-8) appear to be Smith's species.

Description — Shell small, 14-22 mm. (about $\frac{3}{4}$ inch) in height, claviform, very solid. Spire-whorls sculptured firstly with a rather wide subsutural band, composed of four spirals, three of them threads, but the fourth is a moderately strong cord; then a strong median cord which is conspicuously undulated and thickened where it crosses rather distant axial folds, which spread as buttresses above the peripheral cord but not below it, and finally, another strong but smooth cord between the periphery and the lower suture. Base with six strong cords, distantly spaced between the periphery and the anterior fasciole, which is sculptured with 5 or 6 irregular linear-spaced cords. Interstices

of the keels and cords with 3 or 4 distinct spiral lirations, densely decussated by finer crisp axial threads. Spire almost twice height of aperture plus canal. Sinus deep, U-shaped, and situated at the termination of the peripheral keel. Colour dark chocolate to dark purplish brown, with a pale buff or light-brown band between the peripheral and lower keels. In partially bleached specimens the pale band is more conspicuous. Operculum leaf-shaped with a terminal nucleus.

Measurements (mm.) —

height	width	
22.0	8.0	holotype
21.0	8.0	Honolulu, dredge deposits
18.2	7.3	Honolulu, dredge deposits
14.0	6.0	Honolulu, off Waikiki beach

Synonymy —

1877 *Pleurotoma albofasciata* E. A. Smith, Ann. Mag. Nat. Hist., Ser. 4, 19, p. 491.

1895 *Surcula gatchensis* Hervier, Journ. de Conch., 44, p. 61, pl. 1, fig. 7.

1914 *Surcula bijubata gatchensis* Hervier, Bouge and Dautzenberg, Journ. de Conch., 61, p. 145.

1960 *Turridrupa gatchensis* (Hervier), Oyama and Takemura, The Molluscan Shells, pt. 4, figs. 6-8.

Records — HAWAIIAN ISLANDS (type locality); Hawaii, Keokea, Hilo, in sand under seaweed (Thaanum coll., Bishop Mus.); Oahu, off Waikiki, 25-50 fathoms; Honolulu Harbour entrance, 5-8 fathoms; Paumotu (USNM); Pupukea Beach and Waialua (USNM); Maui, off Launiupoko Camp, 4-12 fathoms (Thaanum coll., USNM); Maalea Bay, 50 feet, in coralline algae (A. Tiedeman, 1964); McGregor's Landing, Maalea Bay, 25-30 feet (A. Tiedeman, 1964); French Frigate Shoal (ANSP). JAPAN: Amami-Oshima Islands (Oyama and Takemura), LOYALTY ISLANDS: Lifu (Hervier, 1895). NEW CALEDONIA: (Bouge and Dautzenberg, 1914).

Types — The holotype of *albofasciata* is in the British Museum (Natural History); that of *gatchensis* in the collection of the Journal de Conchyliologie, Mus. d'Hist. Nat., Paris.

***Turridrupa armillata* (Reeve, 1845)**

(Pl. 305, fig. 2)

Range — Philippine Islands.

Remarks — This species belongs to the *acutigemmata-jubata-prestoni* series, in which the sinus keel, between the subsutural fold and the periphery is gemmate. In *jubata* and *prestoni* the gemmules are rather distant, laterally elongated and knot-like, but in *armillata* they are numerous, closely-spaced beads.

The holotype in the British Museum is the only specimen known to me, and this has a distinctive colour pattern: whitish, with a subsutural band of

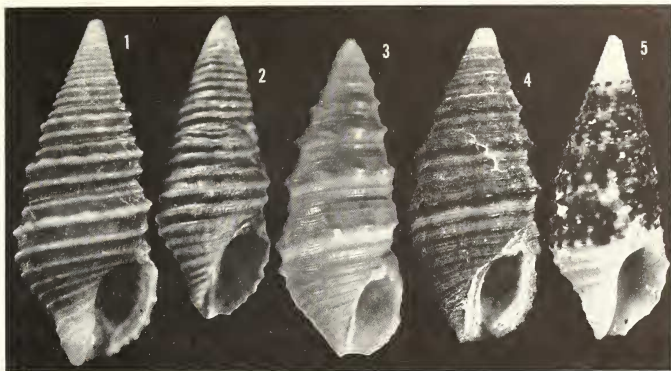


Plate 303. Figs. 1, 2, *Turridrupa bijubata* (Reeve). Fig. 1, Mauritius. 24 mm. Fig. 2, Island of Burias, Philippines. Syn-type, 21 mm. Figs. 3, 4, *T. albofasciata* (E. A. Smith). Fig. 3, Hawaiian Islands, holotype, 22 mm. Fig. 4, French

Frigate Shoals, 22 mm. Fig. 5, *T. weaveri* Powell, new species, holotype, 21.7 mm. 45 ft. off Rabbit Island, Oahu, Hawaiian Islands.

light-brown. It seems most nearly related to *jubata*, but unfortunately the type of that species, which should be in the British Museum, could not be located.

Description—Shell small, 18.5 mm. ($\frac{3}{4}$ inch) in height, somewhat broadly fusiform, with spire about $1\frac{1}{2}$ times height of aperture plus canal. Spire whorls sculptured with three strong subequal keels; first smooth and submargining the suture, second, the sinus keel, densely gemmate, followed by the smooth peripheral keel; base with the addition of seven strong smooth keels to the anterior fasciole, which has 4-5 closely spaced cords. Colour as described above.

Measurements (mm.)—

height	width
18.5	7.25

Synonymy—

1845 *Pleurotoma armillata* Reeve, Conch. Iconica, 1, pl. 21, fig. 176.

Types—The holotype is in the British Museum (Natural History). The type locality is "Philippines."

***Turridrupa stricta subspecies stricta* (Reeve, 1843)**

(Pl. 305, fig. 4)

Range—Tuamotu Archipelago.

Remarks—This species differs from the other members of the genus in having a maculated peripheral sinus rib. This rib is a single smooth keel,

quite unlike the double keel of *Lophiotoma*. In the form of the sculpture and in the style of U-shaped sinus, the species is not very dissimilar from *cincta*. Unfortunately only a few worn shells are available and all have the apical whorls missing.

Description—Shell small, 14 mm. ($\frac{1}{2}$ inch) in height, drilliform, somewhat cylindrical, very solid, sculptured with strong smooth spiral keels, the peripheral sinus keel maculated. Spire almost twice height of aperture plus canal. Spire-whorls with three equidistant keels, the median one stronger than the other two, which are subequal. Base with an additional five keels, and 4 or 5 more closely spaced spiral cords on the anterior fasciole. Interspaces with 3 or 4 fine, crisp, spiral threads. Sinus U-shaped, its apex at the termination of the peripheral keel. End of the subsutural keel somewhat thickened, but no parietal tubercle or callus-pad. Anterior canal very short, with an oblique shallowly-notched end. Colour bright, yellowish buff, except for the peripheral keel which is white and regularly maculated with dark reddish brown dashes. A Japanese shell ascribed to *stricta*, by Oyama and Takemura, 1960 (see under *modesta*, following), has the peripheral maculations more numerous and in the form of squarish dots.

The colour pattern and truncated anterior end recalls some members of *Lophiotoma* of the *ab-breviata* series, but as already remarked, the sinus in that genus is a deep narrow slit and its associated keel is double-edged with a concavity in the middle.

Measurements (mm.)—

height	width	
14.0	5.5	Tuamotu Archipelago (ex Garrett)
13.5	5.0	Lectotype; one of two co-types

Synonymy—

- 1834 *Pleurotoma interrupta* Sowerby, Proc. Zool. Soc., London, for 1833, p. 138 (non Lamarck, 1816).
 1843 *Pleurotoma astricta* Reeve, Conch. Iconica, 1, pl. 12, fig. 98 (nom. nov. for *Pl. interrupta* Sowerby, 1834; non Lamarck, 1816).

Records—"Island of Annaa, Chain Island"= Island of Annaa, Tuamotu Archipelago, under coral on reefs (type locality); "Paumotu Isles"= Tuamotu Archipelago (Garrett coll., B. P. Bishop Mus.).

Types—Two co-types, one selected as lectotype, in the British Museum (Natural History).

***Turridrupa astricta subspecies*
conosbrina Powell, new subspecies**

(Pl. 305, fig. 3)

Range—Hawaiian Islands and Amami-Oshima Islands, Japan.

Remarks—This seems to be a North Pacific subspecies of *astricta*, differing slightly but constantly from the typical South Pacific species in having all three cords of the spire-whorls of equally strong development, and smaller, more numerous maculations, which are not confined to the sinus rib. In *astricta* typical, the maculations are more widely spaced, elongated dashes, confined to the sinus cord, which is of heavier build than the two other cords of the spire-whorls.

Description—Shell rather small, 19 mm. ($\frac{3}{4}$ inch) in height. Spire twice height of aperture plus canal. Whorls 14 including a narrowly conic protoconch of $4\frac{1}{2}$ whorls, which are closely sculptured with concavely arcuate axials crossed by minute indistinct spiral lirae. Spire-whorls with three equally strong but narrowly ridged spiral cords. Five similar cords on the body-whorl from the sinus cord to the neck and a further three on the anterior fasciole. From 2.5 very fine spiral threads in each interspace, except for a wider interspace on the neck, which bears about nine threads. Entering parietal callus-pad heavy. Sinus deep, U-shaped, at the termination of the middle cord of the spire-whorls. Colour buff to pale golden-brown, maculated with dark reddish brown spots, about 15 per whorl on the sinus cord but irregularly disposed also on the other cords of both the spire and the base.

Measurements (mm.)—

height	width	
19.0	7.0	holotype
14.5	5.0	paratype

Synonymy—

- 1960 *Turridrupa astricta* (Reeve), Oyama and Takemura, The Molluscan Shells, 4, figs. 11, 12 (non Reeve, 1843).

Records—HAWAIIAN ISLANDS: Maalaea Bay, Maui Id., in and under calcareous algae, 40 to 50 feet (J. Kern and A. Tiedeman, ex. C. Weaver) (holotype). JAPAN: Amami-Oshima Islands (Oyama and Takemura, 1960).

Types—The holotype and paratypes presented to the B. P. Bishop Museum, Honolulu, by Mr. J. Kern.

***Turridrupa bijubata* (Reeve, 1843)**

(Pl. 303, figs. 1, 2)

Range—Mauritius, Japan to Hawaiian Islands, Philippines, Queensland, New Caledonia and Fiji.

Remarks—This strongly keeled, solid, small shell has the keels buff-coloured on a dark chocolate ground. Three keels encircle the spire-whorls; these are not gemmulate but often the sinus keel is somewhat waved and thickened on the crests of low axial folds.

Description—Shell small, 18-21 mm. (about $\frac{1}{2}$ inch) in height, drilliform, very solid, sculptured with strong, sharply raised spiral keels, three on spire-whorls, one subsutural and slightly weaker than the other two; median one, the sinus rib, undulating and slightly thickened at the crests of very weak broad axial folds; base with an additional four keels and five more closely-spaced, weaker spirals on the anterior end. Interstices of the keels with 4 or 5 very fine, crisp, spiral threads. Spire almost twice height of aperture plus canal. Sinus U-shaped, its apex on the second or middle keel of the spire-whorls. Anterior canal very short, flexed, with an oblique shallowly notched termination. Colour dark purplish brown or chocolate, with the keels buff to light-brown.

Measurements (mm.)—

height	width	
21.0	8.25	one of three syntypes
18.5	8.0	Low Isles, Queensland
18.0	7.0	San Cristoval, Solomon Islands

Synonymy—

- 1843 *Pleurotoma bijubata* Reeve, Conch. Iconica, 1, pl. 10, fig. 87.
 1914 *Succula bijubata* (Reeve), Bouge and Dautenberg, Journ. de Conch., 61, p. 144.

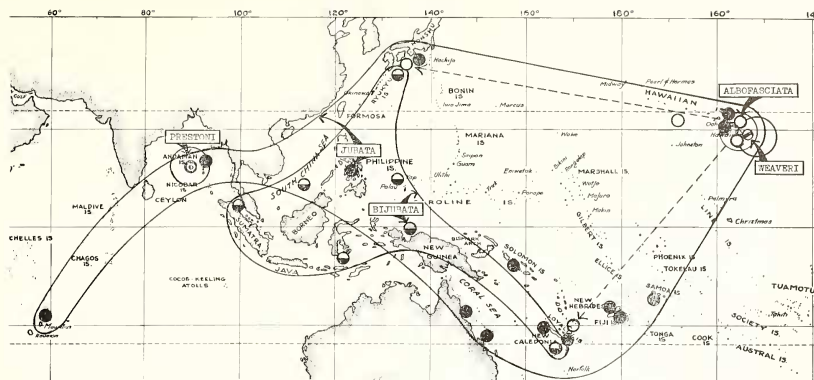


Plate 304. Geographical distribution of *Turridrupa jubata* (Hinds), *T. bijubata* (Reeve), *T. albifasciata* (E. A.

Smith), *T. prestoni* Powell and *T. weaveri* Powell.

1914 *Surcula bijubata nodulosa* Bouge and Dautzenberg, Journ. de Conch., 61, p. 145.

1960 *Turridrupa bijubata* (Reeve), Oyama and Takemura, The Molluscan Shells, pt. 4, figs. 3-5.

Records — MAURITIUS (AWBP. coll.). ANDAMAN ISLANDS: Long Island, Port Blair, dredged (Winckworth coll., Brit. Mus.). PHILIPPINES: Island of Burias, under stones at low water (type locality); JAPAN: (Oyama and Takemura) Oshima-Osumi (USNM). HAWAIIAN ISLANDS: Oahu, Mokolua Rock, Kailua Bay, 55-65 feet, in sand pockets under coral (C. Weaver, Dec., 1963); Maui, 50 feet, in coralline algae (A. Tiedeman and J. Kern,

1964). SOLOMON ISLANDS: San Cristoval (Aust. Mus.). QUEENSLAND: Low Isles; North West Island (Mrs. J. Kerslake). NEW CALEDONIA: Poidimie (Mrs. J. Kerslake). LOYALTY ISLANDS: Lifu (Aust. Mus.). FIJI: (Garrett coll., ANSP); Korolevu (Mrs. J. Kerslake); Navula Passage, main reef, 2 feet (W. Jennings, Aug., 1963). SAMOA: Vaialele Beach (AWBP. coll.).

Types — There are three syntypes in the British Museum (Natural History). The type locality is the Island of Bureas [Burias], Philippines.

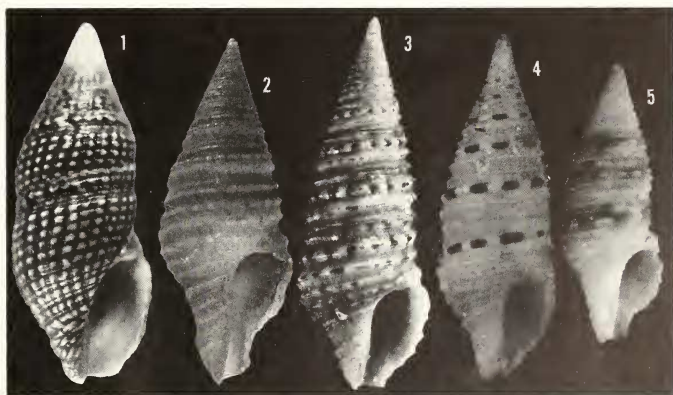


Plate 305. Fig. 1, *Turridrupa crithina* (Anton), syntype of *Pleurotoma digitale* Reeve. 24 mm. Island of Burias, Philippines. Fig. 2, *T. armillata* (Reeve), holotype, 18.5 mm., Philippine Islands. Fig. 3, *T. astricta consobrina*

Powell new subspecies, holotype, 19 mm. 40-50 ft., Maui Id., Hawaiian Islands. Fig. 4, *T. astricta astricta* (Reeve). 14 mm., Tuamotu Archipelago. Fig. 5, *T. diffusa* Powell new species, holotype, 12 mm., Samoa.

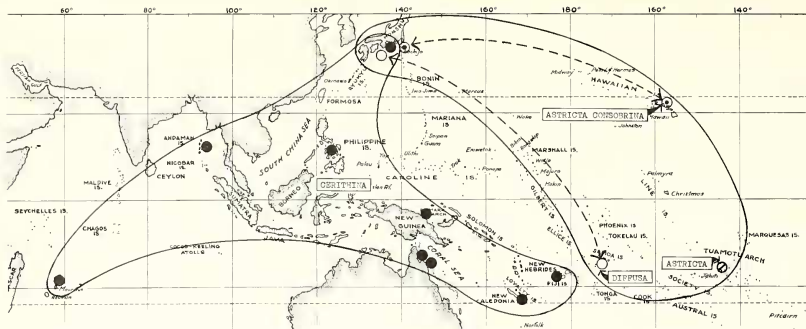


Plate 306. Geographical distribution of *Turridrupa cerithina* (Anton), *T. astricta* (Reeve), its subspecies *consobrina* Powell and *T. diffusa* Powell.

Turridrupa cerithina (Anton, 1839)

(Pl. 305, fig. 1)

Range – Mauritius to Japan, Philippines, Queensland, New Caledonia and Fiji.

Remarks – In this species all the spiral keels and cords are gemmate at the points of intersection with the numerous narrow flexuous axials. Colour dark chocolate with the gemmules picked out in white. The apex of the normal U-shaped sinus is at the termination of one or two spiral threads which bisect the shoulder sulcus.

Description – Shell of moderate size, 18–24.5 mm. ($\frac{3}{4}$ –1 inch) in height, solid, drilliform, with a tall spire but with a truncated anterior end. Sculpture of spiral keels and cords which are densely gemmulate at the points of intersection with numerous narrow flexuous axial ribs. The suture is submargined by a closely spaced pair of spirals, the upper one weak but the lower one massive. This is followed by the rather narrow, deeply concave shoulder sulcus which bears one or two fine spiral threads. Peripheral spiral on the site of a slight angulation, below which the spirals continue over the base to the anterior fasciole.

There are from 1–3 spirals between the peripheral keel and the lower suture or 7–10 between the periphery and the anterior fasciole; 5 or 6 weaker,

linear-spaced, smooth cords on the anterior fasciole. Spire about $1\frac{1}{2}$ times height of aperture plus canal.

Anterior canal very short and weakly notched, with an oblique termination. In senile specimens the subsutural fold thickens at its termination to form a callosity, slightly restricting the U-shaped sinus which is at the termination of the one or two threads bisecting the shoulder sulcus. Colour dark chocolate with the gemmules picked out in white; pillar light reddish brown; interior of aperture light purplish grey.

Measurements (mm.) –

height	width	
24.5	9.0	Japan
24.0	9.0	one of three syntypes
20.0	7.5	Mauritius

Synonymy –

- 1839 *Pleurotoma cerithina* Anton, Verzeichniss der conchylien, p. 73, sp. 2504.
- 1843 *Pleurotoma digitale* Reeve, Conch. Icon., 1, pl. 17, fig. 138.
- 1884 *Drillia* (*Crassispira*) *digitalis* (Reeve), Tryon, Man. of Conch., 6, p. 191, pl. 13, fig. 75.
- 1914 *Drillia* (*Crassispira*) *digitalis* (Reeve), Bouge and Dautzenberg, Journ. de Conch., 61, p. 143.
- 1922 *Turridrupa cerithina* (Anton), Hedley, Rec. Aust. Mus. 13(6), p. 226.

Records – PHILIPPINES: Island of Burias, under stones at low water (type locality). JAPAN: Oshima-Osumi (USNM). NEW GUINEA: Finschafen (T. Garrard). QUEENSLAND: Low Isles (AWBP coll.); Buchan's Point (Mrs. J. Kerslake). NEW CALEDONIA: (Bouge and Dautzenberg, 1914). FIJI (USNM). ANDAMAN ISLANDS: Port Blair (Winckworth coll., Brit. Mus.). MAURITIUS: (ANSP and AWBP coll.).

Types – Three syntypes of *digitalis* are in the British Museum (Natural History).

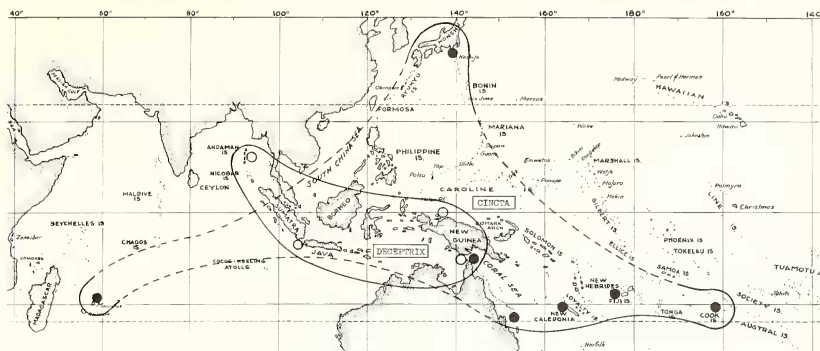


Plate 307. Geographical distribution of *Turridrupa cincta* (Lamarck) and *T. deceptrix* Hedley.

Turridrupa cincta (Lamarck, 1822)

(Pl. 301, fig. 5)

Range — Mauritius, Queensland, Japan and Fiji.

Remarks — This shell stands nearest to *bijubata* in size and general appearance but is easily distinguished from that species by the uniform yellowish brown colour, lack of axial undulations, and different arrangement of the keels on the spire-whorls, the subsutural one being far heavier than the other two, of which the median sinus one is quite weak.

Description — Shell small, 14.5-16.5 mm. (about $\frac{3}{8}$ inch) in height, drilliform, very solid, sculptured with strong spiral keels, with 3 or 4 fine, crisp, spiral threads in each interspace. Spire-whorls with a massive subsutural keel, followed by a very weak median one, the sinus rib, and then a strong one below it; four more strong keels on the base, uppermost emergent at the suture, and five closely-spaced cords on the anterior end. Spire more than $1\frac{1}{2}$ times height of aperture plus canal. Apical whorls acuminate. Sinus small, narrowly U-shaped, its apex on the weak median spiral. Anterior canal very short, with an oblique, shallowly-notched termination. Colour uniform light yellowish brown.

Measurements (mm.) —

height	width	
16.5	7.0	Mauritius
16.0	6.5	Mauritius
14.5	6.5	Fiji

Synonymy —

1822 *Pleurotoma cincta* Lamarck, Hist. nat. anim. sans Vert., ed. 1, 7, p. 92.

1939-40 *Pleurotoma cincta* (Lamarck). Kiener, Icon. Coq. Viv., Pleurotome, p. 60, pl. 19, fig. 5.

1960 *Turridrupa cincta* (Lamarck, Oyama and Takemura, The Molluscan Shells, pt. 4, figs. 1, 2.

Records — "les mers de l'île de France" = Mauritius (type locality) (AWBP coll.); Barkley Island (Mrs. J. Kerslake). JAPAN: Amami-Oshima Islands (Oyama and Takemura). QUEENSLAND: North West Island (Mrs. J. Kerslake); Portland Roads, Cape York Peninsula (T. Garrard). FIJI: (A. Garrett, ANSP). "HERVEY ISLANDS" = COOK ISLANDS: (B. P. Bishop Mus.). NEW CALEDONIA: Poindimie (Mrs. J. Kerslake).

Turridrupa modesta (Sowerby, 1834)

Localities — "Real Llejos [Nicaragua] et ad Insulam Annaa" [Tuamotu Archipelago].

Remarks — Upon the available evidence, the status of this species cannot be determined, for the type, which should be in the British Museum, cannot be found. Reeve in 1843 (Conch. Icon. 1, pl. 12, fig. 99) and Tryon (1884, Man. of Conch. 6, p. 241) considered it a synonym of *cincta* Lamarck, 1822, and said the first mentioned locality, "Real Llejos," was probably erroneous. Shells in the Garrett collection at the B. P. Bishop Museum, labelled "*Pl. modesta* Sowerby, Hervey Islands" are undoubtedly *cincta*, and since Garrett probably relied upon the British Museum for his identifications, Sowerby's species may well be a synonym of *cincta* as Reeve claimed.

Also, Sowerby made no mention of peripheral maculations in his original description of *modesta*, but he did mention "cingulo mediano nigro, albo articulata" for his *interrupta* (i.e., *stricta*), also from the Island of Annaa, and described in the same paper.

On the other hand, Oyama and Takemura (1960, The Molluscan Shells, pt. 4, figs 13, 14), figured a maculated Japanese shell as *modesta*, and this is certainly not *cincta*. A shell very similar to Oyama and Takemura's "*modesta*" from Samoa (AWBP coll.) likewise has the peripheral dashes uncoloured, but defined by surrounding diffused blotching in brown. See *T. diffusa* Powell, new species.

Synonymy —

- 1834 *Pleurotoma modesta* Sowerby, Proc. Zool. Soc., London, for 1833, p. 136.
1843 *Pleurotoma cincta* Lamarck, Reeve, Conch. Icon., 1, pl. 12, fig. 99.

Turridrupa deceptrix Hedley, 1922

(Pl. 301, fig. 2)

Range — North Queensland and New Guinea to the Andaman Islands.

Remarks — This species resembles *jubata* in its crisp, narrow, spiral keels but has more the shape of *acutigemmata*. It differs from both, however, in the lack of gemmules.

Description (original) — "Shell elongate-conic, very solid, contracted at the base, constricted and channelled at the suture, last whorl about half the total length; eleven whorls, including the protoconch. Colour pale ochraceous-buff, aperture lighter. Sculpture: — Last whorl with thirteen, penultimate with four, and earlier whorls with three prominent spiral keels, the furrows between which carry faint radial striae, and sometimes a small interstitial thread. Aperture: — There is a thin callus sheet on the inner lip, and a solid callus plug at the angle of the aperture; outer lip simple; sinus a semicircular notch with reflected margin; canal short, open, and slightly recurved; deep within the throat are five revolving raised threads."

Measurements (mm.) —

height	width	
19.0	6.5	Japen Island, West New Guinea
14.0	6.0	holotype

Synonymy —

- 1922 *Turridrupa deceptrix* Hedley, Rec. Aust. Mus., 13(6), p. 227, pl. 42, fig. 14.

Records — QUEENSLAND: Darnley Island, 30 fathoms (type locality). WEST NEW GUINEA: 1 mi. S.E. of Cape Dgarwarwoffi, Japen Island, 10-16 fathoms, coarse gravel and silt (NSF, ANSP). ANDAMAN ISLANDS: Port Blair (Winckworth coll., Brit. Mus.). INDONESIA: Sunda Strait, 30 metres (Th. Mortensen, 1922, Zool. Mus., Copenhagen).

Types — The holotype is in the Australian Museum, Sydney.

Turridrupa diffusa Powell, new species

(Pl. 305, fig. 5)

Range — Samoa and Japan.

Remarks — This species belongs to the *astricta* group. It is readily distinguished by its narrow form and the reversed colour pattern, in that the peripheral nodes are colourless, being defined by a surrounding diffused brown blotching. The Japanese record, based upon Oyama and Takemura's figures, shows a shell with smaller and more numerous nodes. When more material is available this may prove to be distinct from typical *diffusa*.

Description — Shell small, 12 mm. ($\frac{1}{2}$ inch) in height, drilliaform, narrowly subcylindrical, solid, sculptured with strong spiral cords, smooth except for the sinus one, which bears laterally elongated slightly raised losenge-shaped nodes. These nodes are accentuated by being picked out by a surrounding diffusion of pale reddish brown blotches on an otherwise creamy-white ground. Spire less than twice height of aperture plus canal. Postnuclear whorls about 10 (apex eroded). Spire-whorls sculptured with a heavy, narrowly ridged, subsutural cord, followed by the weakly nodulose sinus rib, and two plain, narrowly ridged cords between it and the lower suture. The subsutural cord is strongest, but those following it diminish only slightly in strength; seven cords on the body-whorl from below the sinus rib to the end of the anterior canal; one or two intermediate spiral threads over the region of the neck. There are about nine nodes on the sinus cord of the last whorl. Parietal callus-pad heavy. Sinus deep, U-shaped, at the termination of the nodulose rib.

Measurements (mm.) —

height	width	
12.0	4.5	holotype

Synonymy —

- 1960 *Turridrupa modesta* (Sowerby), Oyama and Takemura, The Molluscan Shells, pt. 4, figs. 13, 14 (non Sowerby, 1834).

Records — SAMOA (ex A. J. Garrett) (holotype). JAPAN: Amami-Oshima Islands (Oyama and Takemura, 1960).

Types — The holotype is in the Powell collection, Auckland Museum.

Turridrupa jubata (Hinds, 1843)

(Pl. 301, fig. 3)

Range — Japan to Melanesia.

Remarks — It is difficult to be positive about the identity of *jubata* since the holotype can no longer be found, but there seems to be little doubt that the species is closely allied to *acutigemmata*, from which it differs in being more broadly fusiform and in having more numerous and smaller gemmules on the sinus rib. These gemmules are not only laterally compressed but are slightly oblique as well, which gives something of the appearance of a strand unravelled from a rope.

Description — Shell small, 26 mm. (1 inch) in height, rather broadly fusiform with tall spire, about 1½ times height of aperture plus canal, which is relatively long for the genus. Sculpture of narrow, sharply raised spiral keels, three on the spire-whorls; first smooth and subsutural; second, the sinus rib is delicately beaded (about 25 per whorl); third keel smooth. On the base are seven additional and equally strong smooth keels, plus five weak but crisp spiral cords on the fasciole. Surface smooth except for excessively fine axial growth lines. Sinus deep, narrowly U-shaped, its apex at the termination of the beaded keel. Colour pale yellowish brown, sometimes with the anterior end white.

Measurements (mm.) —

height	width	
26.0	—	fide Hinds
22.5	8.5	Palau Is., Arakabesan Id., dredged
22.0	8.0	Palau Is., Malakal Harbour, 25-30 fathoms

Synonymy —

- 1843 *Pleurotoma jubata* Hinds, Proc. Zool. Soc. for 1843, London, p. 37.
 1843 *Pleurotoma jubata* Hinds, Reeve, Conch. Iconica, 1, pl. 7, fig. 52.
 1844 *Pleurotoma jubata* Hinds, Voy. H.M.S. Sulphur, 2, p. 15, pl. 5, fig. 3.
 1913 *Pleurotoma* (*Hemipleurotoma*) *jubata* Hinds, Schepman, Siboga Exped., Pt. 5, 49e, p. 400.
 1960 *Turridrupa jubata* (Hinds), Oyama and Takemura, The Molluscan Shells, pt. 4, fig. 10 (not fig. 9, which is *acutigemmata*).

Records — STRAITS OF MALACCA: found in mud at the depth of eighteen fathoms (type locality). JAPAN: Izu Peninsula (Oyama and Takemura, 1960); Shionomizaki, Kii (ANSP). PALAU ISLANDS: dredged off Arakabesan Island (ANSP); off Malakal Harbour, 25-30 fms. (ANSP). WEST NEW GUINEA: ½ mi. S. of Maroepi, Ambai Islands, Japen Island, 14-25 fms.; 2 mi. N. of Matas, Aoceri Islands, Geelvink Bay, 18-20 fms. (ANSP). CELEBES: between islands of Wovoni and Buton, 75-94 metres (Schepman, 1913). NEW CALEDONIA: Poindimie (Mrs. J. Kerslake).

Turridrupa prestoni Powell, new name

(Pl. 301, fig. 4)

Range — Andaman Islands.

Remarks — The name *Pleurotoma rimata* Preston, 1908, is preoccupied by *Pleurotoma* (*Drillia*) *rimata* E. A. Smith, 1888, so a new name is hereby provided. This species stands between *jubata* and *acutigemmata*. It has the general shape of *jubata* but attains a much larger size. The interstices of the keels are spirally lirate, not smooth, and the gemmules are laterally elongated as in *acutigemmata*, and there are more of them, 17, compared with 13 or 14 in the latter species.

Description — Shell large for the genus, 25-33 mm. (1-1¼ inches) in height, broadly fusiform with tall spire, almost 1½ times height of aperture plus canal, which is relatively long for the genus. Sculpture of stout but narrowly crested keels, of varying strength, with from 1-4 fine crisp spiral threads in most interspaces. Spire-whorls with three keels and a fourth sometimes emergent over the last two whorls; firstly a moderately strong smooth subsutural keel, followed by the gemmate sinus keel, also moderately strong, and then a massive smooth peripheral keel just above the lower suture. On the base, from level with the top of the aperture to the anterior fasciole, are a further eight spiral keels, followed by five cords on the fasciole. Sinus deep, U-shaped, its apex at the termination of the gemmate median keel. Colour yellowish brown, paler over neck and anterior end.

Measurements (mm.) —

height	width	
33.0	12.5	Port Blair, Andaman Islands
33.0	12.0	Port Blair, Andaman Islands
25.5	10.0	holotype

Synonymy —

- 1908 *Pleurotoma rimata* Preston, Rec. Indian Mus., 11, p. 190, pl. 17, fig. 62 (non *Pleurotoma* (*Drillia*) *rimata* E. A. Smith, 1888).

Records — ANDAMAN ISLANDS (type locality): Port Blair (Winckworth coll., Brit. Mus.).

Turridrupa weaveri Powell, new species

(Pl. 303, fig. 5)

Range — Hawaiian Islands.

Remarks — This species is not very closely allied to any other described member of the genus. It does, however, show some resemblance to *cerithina* (Anton, 1839) in that both have a tessellated pattern in dark-brown upon a pale ground, but in

cerithina the pattern is over the entire shell, whereas in *weaveri* it is absent from both the early spire-whorls and the base. Other points of difference between the two species are that the keels are gemmate in *cerithina* but smooth in *weaveri*; also there are 1-3 spiral threads in the shoulder sulcus of *cerithina* but none in *weaveri*.

The species is named for Mr. Clifton Weaver of Hawaii, who generously made available all the Hawaiian turrids in his collection.

Description — Shell comparatively large, 18-23 mm. (about 1 inch) in height. Spire tall, almost twice height of aperture plus canal. Protoconch eroded away in the holotype, but in a not fully adult specimen from Mokumanu Island, Oahu, it is conical, with a low dome-shaped smooth initial whorl, followed by $1\frac{1}{2}$ whorls sculptured with strong, closely-spaced, vertical axials which terminate abruptly as the tricarinate post-nuclear sculpture commences. Spire-whorls sculptured with three cords plus a fourth, emergent over the last whorl. Subsutural cord massive, followed by the sinus cord of less than half that strength, and one or two cords below, which are slightly heavier than the sinus cord. Three or four strong widely spaced cords on the base, with 3 or 4 threads in each interspace, followed by 5 or 6 irregular cords on the anterior fasciole. Colour creamy white, heavily maculated with dark reddish brown in an irregular tessellated pattern. The maculations are absent from the early spire-whorls and cease abruptly at the lower suture, which leaves the base unicoloured.

Measurements (mm.) —

height	width	
18.0	7.0	Mokumanu Id., Oahu
21.7	8.75	holotype
23.0	9.0	off Kewalo, Oahu

Records — HAWAIIAN ISLANDS: 45 feet, off Rabbit Island, Oahu (type) (C. Weaver, Nov., 1961); off Pokoi Bay, 40 feet, sand and coral; off Kewalo, Oahu, 20 fathoms (Mrs. M. King, March 28, 1962); off Waikiki, Oahu, 100-190 fathoms (P. Burgess, April-June, 1953); Mokumanu Island, Oahu, 65-75 feet, attached to base of small coral chunk (A. Tiedeman and C. Weaver, March 26, 1965).

Types — The holotype is presented to the B. P. Bishop Museum, Honolulu by Mr. Clifton Weaver.

FOSSIL SPECIES

Turridrupa maoria Powell, 1942

Range — New Zealand, upper Miocene.

Remarks — The record of this genus in the New Zealand upper Miocene is based upon a single imperfect specimen. However, the presence of a spiral rib traversing the sinus area, the tuberculate peripheral spiral keel, and evidence of axial costae on what remains of the nuclear whorls, make the generic reference almost certain.

Measurements (mm.) —

height	width
5.3	2.25

Synonymy —

1942 *Turridrupa maoria* Powell, Bull. No. 2, Auckland Mus., p. 117, pl. 11, fig. 10.

Records — NEW ZEALAND: N. Z. Geol. Surv. loc. 1340, tuffaceous arenaceous mudstone, 2000'-3000' above the Waikokopu sandstone, 0.35 mi. up north-flowing nameless stream from road bridge, block 12, Ngatapa S.D. (base of Mapiiri series, upper Miocene).

Types — The unique holotype is in the New Zealand Geological Survey, Wellington.

Genus *Taranis* Jeffreys, 1870

Type: *Trophon mörchi* Malm, 1863

A very widely distributed genus of miniature *Bathytoma*-like shells, but with a much shallower sinus, the apex of which is on the peripheral keel. Angles of approach of sinus unequal, being steep and straight above but protractively arcuate below.

Protoconch paucispiral, of barely two whorls, papillate, slightly globose, apparently smooth, but under high magnification there is a dense sculpture of minute stippled lirae. Pillar abruptly twisted at the commencement of a short shallowly notched anterior canal. Post-nuclear sculpture clathrate; distant keels or strong spiral cords, crossed by crisp lamellate axials. There is no operculum, according to Jeffreys, in his original description of the genus.

The type species of *Taranis* (pl. 308, fig. 1) has a wide distribution in moderately deep water from Norway to the Mediterranean and the Atlantic coast of the United States to the Gulf of Mexico.

The Australasian genus *Fenestrosyrinx* is identical with *Taranis* both in general appearance and also in the form and sculpture of the protoconch. Another apparent synonym is the genus *Allo* (from a manuscript of Jousseaume), and a substitute name for it, *Feliciella*, both published in the same paper by Lamy (1934, *l.c.*) and based upon a small Red Sea shell.

In addition to the species dealt with here, other members of the genus are: *alexandrina* Sturany, 1896, from off Alexandria, Egypt; *cirrata* Brugnone, 1862, Pleistocene of Sicily and elsewhere in Europe; *strongi* Arnold, 1903, and *inculta* Moody, 1916, both from the Pleistocene of California.

The Recent range of *Taranis* is now known to cover the North Atlantic, the Mediterranean and the Red Sea, and extends also to Hongkong, Japan, Queensland, eastern Australia, South Australia and New Zealand. Fossil occurrences are known from the Pleistocene of England, Sicily, New Zealand and California, and the Pliocene of Italy. Probably many other species, both Recent and fossil, will later be recognized as members of this wide ranging genus.

Although *Taranis* resembles a *Bathytoma* or *Micantapex*, in miniature, there is probably no close relationship. The genus is referred to the subfamily Turrinae solely because of the peripheral position of the sinus, but this feature is not an infallible guide to the Turrinae, as evidenced by *Bathytoma* and *Micantapex*, both of which have a different style of radula.

Synonymy —

- 1870 *Taranis* Jeffreys, Ann. Mag. Nat. Hist., Ser. 4, 5, p. 447. Type by monotypy: *Trophon mörchi* Malm, 1863.
 1926 *Fenestrosyrinx* Finlay, Trans. N. Z. Inst., 56, p. 254. Type by original designation: *Turris nexilis bicarinatus* Suter, 1915.
 1934 *Allo* (Jousseaume ms.) Lamy, Journ. de Conch., 78, pp. 67-71. Type by original designation: *Allo allo* (Jousseaume ms.) Lamy, 1934.
 1934 *Feliciella* Lamy, Journ. de Conch., 78, p. 67 (unnecessary name for *Allo allo*). Type by original designation: *Feliciella jousseaumei* Lamy, 1934.

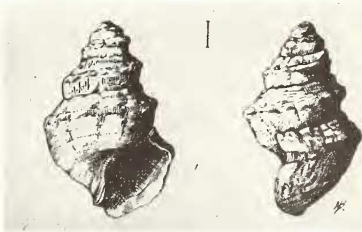


Plate 308. *Taranis allo* (Jousseaume), 4 mm., Djibouti, Red Sea (from Lamy, Journ. de Conch., 78, p. 67, text fig.).

Key to species of *Taranis*

- A. Periphery angulate, but not flanged
 Axials obsolete, fine growth-lines at most
 Periphery sharply angulate
 Keels strong, two on spire, two more on base
imporcata (Dell)
 Periphery weakly angulate
 Keels suppressed, cords moderate, subequal
spirulata (Dell)
 Axial and spiral sculpture subequal, dense, fenestrate
 Shell wide
 Peripheral angle medial *mayi* (Verco)
 Shell narrow
 Peripheral angle at about two thirds whorl height
 Sculpture crisply fenestrate *benthicola* (Dell)
 Sculpture indistinct, fenestrate
turritispira (E. A. Smith)
- B. Periphery angulate but only weakly flanged
 Shell wide
 Subsidiary spiral cords weaker than peripheral one
ticaonica Powell
 Shell narrow
 Subsidiary spiral cords weaker than peripheral one
bicarinata (Suter)
 Subsidiary spiral cords almost as strong as peripheral
gratiosa (Suter)
- C. Periphery a projecting heavy flange
 Peripheral flange crenulated by axial lamellae
 Shoulder lirate
 Subsidiary spiral between periphery and lower suture
 Axials about 16 per whorl *percarinata* Powell
 Axials about 22 per whorl ... *nexilis nexilis* (Hutton)
 Shoulder without lirae *nexilis recens* (Fleming)
 Peripheral flange undulated by distant broad low axials
 Subsidiary spirals sparse and weak ... *allo* (Jousseaume)



Plate 309. Fig. 1, *Taranis morchi* Malm, West Norway. 3 mm. Fig. 2, *T. ticaonica* Powell new species, 2.3 mm., Ticao Island, 226 fms., Philippines, holotype. Fig. 3, *T. turritispira* (E. A. Smith), 6 mm., Japan, co-type in British

Museum. Fig. 4, *T. bicarinata* (Suter), 23 fms. off Ahipara, New Zealand. Fig. 5, *T. nexilis* (Hutton), Castlecliff, New Zealand. Pleistocene. Fig. 6, *T. percarinata* Powell new species, 3 mm., east of Masbate, 135 fms., Philippines, holotype.

Taranis allo Jousseaume, 1934

(Pl. 308)

Range — Known only from Djibouti, Red Sea.

Remarks — This species appears insufficiently distinct from the type of *Taranis* to warrant even subgeneric segregation. Jousseaume's genus *Allo* and species *allo* were described and published posthumously. Authorship by Jousseaume is clearly intended by the editor, Ed. Lamy, particularly since the names appear in the index to that particular volume of the *Journal de Conchyliologie* as belonging to Jousseaume. Lamy added additional remarks deriding the name *Allo allo*, and illegally proposed the substitute names *Feliciella jousseaumei*. I consider them synonyms.

Description — Shell very small, 4 mm. in height, rather broadly ovate-biconic, with a moderately tall spire and truncated body-whorl. Protoconch eroded but evidently paucispiral. Spire-whorls strongly angulated just above the middle by an irregularly nodulose raised keel. Four or five rather indistinct spiral cords on the body-whorl, from below the peripheral carina and over the base. Axial sculpture of weak, rather irregular and distant lamellae. Sinus broadly open, V-shaped, very shallow, its apex on the peripheral carina. The anterior canal is very short, its shallowly-notched extremity being very oblique to the axis.

Measurements (mm.) —

height	width
4.0	3.0

Synonymy —

- 1934 *Allo allo* Jousseaume, *Journ. de Conch.*, 78, p. 67.
 1934 *Feliciella jousseaumei* Lamy, *Journ. de Conch.*, 78, p. 67 (unnecessary substitute name for *Allo allo* Jousseaume).

Records — Known only from the type locality, Djibouti, French Somalia.

Taranis percarinata Powell, new species

(Pl. 309, fig. 6)

Range — Philippines in 80 to 135 fathoms.

Remarks — This species, with its prominent sharp peripheral keel, more closely resembles the New Zealand *nexilis* (Hutton, 1885) than it does the European type of the genus, *mörchi* Malm, which has semi-inflated weakly carinated whorls. From the New Zealand species the Philippine shells differ in having a still more prominent peripheral keel and fewer, stronger axial lamellae.

Description — Shell very small, 3 mm. in height,

with prominently carinated whorls, overridden by lamellate axials and with a truncated anterior end. Spire $1\frac{1}{2}$ times height of aperture plus canal. Whorls $5\frac{1}{2}$, including a papillate protoconch of $1\frac{1}{2}$ whorls, densely sculptured with minute, stippled lirae. Post-nuclear whorls strongly and bluntly carinated below, and a second carina, almost as strong, is emergent over the last half-whorl, followed by two much weaker spirals on the base and five oblique lirae on the anterior end. Prominent lamellate axials, about 16 per whorl, cross the whole surface; these are retractorily slanting and very broadly V-shaped over the spire-whorls, but are recurved arcuately over the base. They crenulate the main carinae and render the secondary spirals gemmate. The sinus is weak, very broadly V-shaped, as defined by the axial lamellae and has its apex on the peripheral carina. The aperture is obliquely subquadrate and is produced below into a very short but strongly flexed, unnotched anterior canal. Colour dull-white.

Occurring in this species is a form which differs in having a sharp, relatively strong, subsutural spiral and another on the body-whorl between the two main carinae. However, there is insufficient material to determine the status of this form.

Measurements (mm.) —

height	width
3.0	1.5

Types — The holotype is in the United States National Museum, Washington (USNM 281739f.).

Records — PHILIPPINES: south of Adyagan Island, east Masbate, 135 fathoms (holotype; Albatross Sta. 5392). Off Destacado Island, east Masbate, 80 fathoms (Albatross Sta. 5213).

Taranis ticaonica Powell, new species

(Pl. 309, fig. 2)

Range — Off Ticao Island, Philippines, in 226 fathoms.

Remarks — This species is very similar to the European *mörchi* Malm, both in shape and in sculpture. In fact, the only differences in the Philippine shell are a slightly more pronounced peripheral carina, more numerous basal spirals, fewer and slightly stronger axial lamellae, and a thicker, less excavated, anterior end.

Description — Shell very small, 2.3 mm. in height, white, biconic, with a tabulated spire, slightly taller than the height of the aperture plus the canal. Whorls 5, including a subglobose protoconch of $1\frac{1}{2}$ whorls, delicately sculptured with closely spaced, minute, stippled lines. Post-nuclear whorls medially

strongly carinate. Suture channelled and submarginated by a moderately strong spiral cord; two slightly weaker cords between the subsutural cord and the periphery, and 1 or 2 between the periphery and the lower suture; about 8 cords on the body-whorl, plus 5 weaker and more closely spaced spirals on the anterior end. The whole crossed by crisp, axial, chevron-shaped lamellae, which follow the outline of the sinus which is a widely open V, with its apex at the peripheral carina.

Measurements (mm.)—

height	width	
2.3	1.3	holotype

Types—The holotype is from Albatross Sta. 5388 and is in the United States National Museum, Washington (USNM, no. 285237).

***Taranis turritispira* (E. A. Smith, 1882)**

(Pl. 309, fig. 3)

Range—Japan.

Description—Shell small, of light build, 6 mm.

in height, elongately ovate, with rounded whorls, weakly angulated at the shoulder. Height of spire slightly greater than height of aperture plus canal. Sculpture clathrate, not very prominent, the spirals dominant, and the axials tending to become subobsolete over the last whorl. Three spiral cords are on the upper whorls, with a fourth emergent over the last whorl. Protoconch paucispiral and with about two whorls (not examined for micro-sculpture). Sinus and other apertural features typical.

Measurements (mm.)—

height	width
6.0	2.0

Synonymy—

- 1882 *Pleurotoma* (*Taranis*?) *turritispira* E. A. Smith, Ann. Mag. Nat. Hist., Ser. 5, **10** (not figured), p. 306.
 1952 *Taranis turritispira* (Smith), Kuroda and Habe, Check List and Bibliogr. Rec. Mar. Moll. Japan, p. 88.

Types—Three co-types in the British Museum (Natural History). The specimen illustrated here is the lectotype. The type locality is Japan.

RECENT AND PLEISTOCENE SPECIES
FROM SOUTHERN AUSTRALIA
AND NEW ZEALAND

Taranis benthicola (Dell, 1956)

Range — New Zealand, off Eastern Otago, 300 fathoms (type locality); Chatham Rise, 200 fathoms, and Pitt Island, 155 fathoms.

Synonymy —

1956 *Fenestroxyrix benthicola* Dell, *Domin. Mus. Bull.*, No. 18, p. 141, fig. 197.

Types — Holotype and paratypes in the Dominion Museum, Wellington.

Taranis bicarinata (Suter, 1915)

(Pl. 309, fig. 4)

Range — New Zealand, Wanganui (Castlecliffian Pleistocene) (*bicarinata*); Recent, off Hen and Chicken Islands (*thomsoni*); off Ahipara, 23 fathoms.

Synonymy —

1885 *Clathurella nexilis* Hutton (partim), *Trans. N. Z. Inst.*, 17, p. 317 (=5 of Hutton's syntypes of *nexilis*).

1915 *Turris* (*Hemipleurotoma*) *nexilis bicarinatus* Suter, *N. Z. Geol. Surv. Pal. Bull.*, No. 3, p. 34.

1919 *Leucosyrinx thomsoni* Mestayer, *Trans. N. Z. Inst.*, 51, p. 133, pl. 8, fig. 5.

1942 *Fenestroxyrix nexilis bicarinata* (Suter), Powell, *Bull.*, No. 2, *Auck. Inst. Mus.*, p. 57.

Types — The holotype of *bicarinata* is in the Canterbury Museum and the holotype of *thomsoni* is in the Dominion Museum, Wellington.

Taranis gratiosa (Suter, 1908)

Range — New Zealand, Port Pegasus, 18 fathoms, Stewart Island (type locality) to Dusky Sound.

Synonymy —

1908 *Bathytoma gratiosa* Suter, *Proc. Malac. Soc.*, 8, p. 186, pl. 7, fig. 19.

1942 *Fenestroxyrix gratiosa* (Suter), Powell, *Bull.*, No. 2, *Auck. Inst. Mus.*, p. 57.

Types — The holotype is in the New Zealand Geological Survey, Wellington.

Taranis imporcata (Dell, 1962)

Range — New Zealand, off Taiaroa Head, 300 fathoms.

Synonymy —

1962 *Fenestroxyrix imporcata* Dell, *Rec. Domin. Mus.*, 4(15), p. 73, fig. 4.

Types — Holotype and paratypes in the Dominion Museum, Wellington.

Taranis mayi (Verco, 1909)

Range — South Australia, 35 miles south-west of Neptune Islands, 104 fathoms.

Remarks — This very small shell, 4.6 mm. in height, is biconical, with medially sharply angled whorls, sculptured with a dense clathrate pattern of numerous thin but sharply raised spirals, crossed by equally strong and numerous axials. Protoconch typical, of two convex apparently smooth but microscopically finely spirally lirate and interstitially punctate. Known only from the type locality.

Synonymy —

1909 *Hemipleurotoma mayi* Verco, *Trans. Royal. Soc. S. Aust.*, 33, p. 295, pl. 25, fig. 2.

**Taranis nexilis subspecies
nexilis (Hutton, 1885)**

(Pl. 309, fig. 5)

Range — New Zealand, Wanganui (Castlecliffian Pleistocene).

Synonymy —

1885 *Clathurella?* *nexilis* Hutton, *Trans. N. Z. Inst.*, 17, p. 317, pl. 18, fig. 9.

1942 *Fenestroxyrix nexilis* (Hutton), Powell, *Bull.*, No. 2, *Auck. Inst. Mus.*, p. 57.

Types — The holotype is in the Canterbury Museum, Christchurch, New Zealand.

**Taranis nexilis subspecies
recens (Fleming, 1948)**

Range — New Zealand, Dusky Sound, 22 fathoms (type locality), and Edwardson Sound, 58 fathoms.

Synonymy —

1948 *Fenestroxyrix nexilis recens* Fleming, *Trans. Royal Soc. N. Z.*, 77, p. 91, pl. 8, fig. 7.

Types — The holotype is in the New Zealand Geological Survey, Wellington.

***Taranis spirulata* (Dell, 1962)**

Range — New Zealand, off Taiaroa Head, 300 fathoms.

Synonymy —

1962 *Fenestrosyrinx spirulata* Dell, *Rec. Domin. Mus.*, 4(15), p. 73, fig. 5.

Types — Holotype and paratypes in the Dominion Museum, Wellington.

Micropleurotoma spirotropoides (Thiele, 1925)

(Pl. 310, fig. 1)

Range — Off South Africa, 126 and 2750 metres.

Measurements (mm.) —

height	width
4.5	2.3

Synonymy —1925 *Pleurotoma spirotropoides* Thiele, Wissenschaft Ergebn. Deutschen Tiefsee-Exped., 17, Gast. 2, p. 213 (179), pl. 23, fig. 18.1929 *Epidora (Micropleurotoma) spirotropoides* (Thiele), Handb. system. Weichtierkunde, 1, p. 362.

Records — SOUTH AFRICA: 35° 19' S; 20° 12' E, 126 metres. Agulhas Bank, 35° 32.8' S; 18° 20.1' E, 2750 metres.

?Micropleurotoma ashiyaensis Shuto and Ueda, 1963

(Pl. 310, figs. 2, 3)

Range — Japan, coastal cliff north of Taya, Ashiya machi, Onaga gun, Fukuoka Prefecture (Ashiya group, Nishisonogian, upper Oligocene).

Remarks — Very doubtfully a member of the genus.

Measurements (mm.) —

height	width
23.4 mm. (incomplete)	13.5

Synonymy —1963 *Micropleurotoma ashiyaensis* Shuto and Ueda, Jap. Journ. Geol. and Geogr., 34(1), p. 2, pl. 1, figs. 1, 2.

Types — The holotype is in the Department of Geology, Kyushu University.

Genus Micropleurotoma Thiele, 1929**Type:** *Pleurotoma spirotropoides* Thiele, 1925

The type species of this genus is a small, rather featureless shell (4.5 mm.), from deep water off South Africa.

The protoconch is relatively large, globose, dome-shaped, smooth and paucispiral. The adult whorls are smooth except for a prominent rounded smooth peripheral keel. The sinus is shallow, its apex on the peripheral keel. Anterior canal short, spout-like and unnotched.

The genus may be near to *Taranis*, which differs in the protoconch being microscopically granulose-lirate and in having the anterior canal shallowly notched.

I have not seen material relevant to this genus, so have no remarks to add to the rather meagre original description.

An alleged second species of the genus, *M. ashiyaensis* Shuto and Ueda, 1963, from the Ashiya group, upper Oligocene of Japan is very doubtfully a member of the genus. The incomplete holotype is very much larger (23.4 mm.) than *spirotropoides*, and in addition to the smooth rounded peripheral carina, has a dense surface pattern of spiral lirations. Except for the lack of peripheral nodes, the Japanese species shows possible affinity with *Luciceras*.

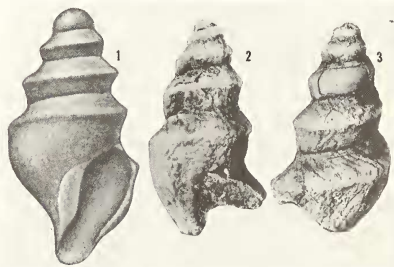
Synonymy —1929 *Micropleurotoma* Thiele, Handbuch der systematischen Weichtierkunde, 1, p. 362. **Type** by original designation: *Pleurotoma spirotropoides* Thiele, 1925.

Plate 310. Fig. 1, *Micropleurotoma spirotropoides* (Thiele), 4.5 mm., South Africa, 2750 metres (from Thiele, 1925, Gast. deutsch. Tiefsee-Exped., 17, pl. 23, fig. 18). Figs. 2, 3, ?*Micropleurotoma ashiyaensis* Shuto and Ueda, 23.4 mm., Japan, upper Oligocene (from Shuto and Ueda, 1963, Jap. Journ. Geol. and Geogr., 34(1), pl. 1, figs. 1, 2).

[These occasional blank areas occur between genera and subgenera to permit the insertion of new material and future sections in their proper systematic sequence.]